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Potential of Calabash tree (*Crescentia cujete*) as a local resource to enhance sustainable livestock farming in the dry Caribbean region

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Abstract.

A multidisciplinary and participative project (i.e. including farmers, technician, researchers and other local actors) is being carried out under the dry Caribbean region of Colombia. The aim is to get new and deep insights in the actual potential of Calabash tree (**CT**; *Crescentia cujete*) for contributing to the sustainable development goals of livestock production in the local context, with native and well-adapted resources. For this, a series of protocols have been placed under real-farm conditions (Farm *El Porvenir* – 10°05'57" N 73°23'53" W). A previously established CT plantation (field layout: 4 m × 4 m) was used. A two-year monitoring protocol was settled (2022-2023) to follow how forage and fruit production and quality are affected by year season, sun exposure (total sun or penumbra) and pruning. Four treatments were allocated 1) Sun-Intact, **SI**; 2) Sun-Pruned, **SP**; 3) Penumbra-Intact, **PI**; 4) Penumbra-Pruned, **PP**. Representative samples were collected (almost bi-monthly) in previously selected adult trees (n= 50 per treatment). The **agronomic** parameters include number of branches (young, medium and adult), forage production (fresh and dry matter per tree and hectare, ha), fruit production (i.e. per tree and per ha, number and weight of fruits, green or ripe). The kinetic of production and nutritive value are followed for each plant component. The **meteorological** local conditions are permanently monitored (i.e. T°C, relative humidity, rainfall, etc.). Thereafter, and considering the great potential of the CT fruit, the project includes the evaluation of different **conservation strategies** for using this resource in the ruminant feeding systems mainly during the dry season. First of all, the saline silage alternative is considered, as this is a common practice established by local farmers in their herds (i.e. other conservation methods are included, such as: fruit dehydration, natural conservation and mixing fruit pulp with fodder –CT leaves and grasses and/or with hay). Furthermore, a key component of the project is related to assessing the role of CT in the **feeding, nutrition and metabolism**, as well as anti-parasitic and enteric methane mitigation potentials when local ruminants (crossed *Bos indicus* cattle) are fed diets composed by CT forage, fresh and/or conserved pulp mixed with other local on-farm produced resources (e.g. *Megathyrus maximus* cv. Tanzania). Protocols combine *in vitro* (Theodorou, 1994; Tilley and Terry, 1963; Bambou, et al., 2009 and RUSITEC® technics), *in situ* (Orskov and McDonald, 1979) and *in vivo* methods (palatability, acceptability, voluntary intake and digestibility trials). Key physiological stages are considered in the *in vivo* trials under silvopastoral conditions of the farm (e.g. around calving) as well as feeding practices during dry season. Datasets are built for each variable, and multivariate analyses, multiple regression and other sound statistical procedures are carried out. The R software is used. Preliminary results until now demonstrate significant ($P < 0.05$) seasonal effects on forage and fruit production, as well as a significant effects ($P < 0.05$) of sunshine gradient and pruning on fruit production. Interpretation of results will be carried with a holistic, systemic, participatory approach, thus considering priorities of local farmers for their final adoption of results on their practical and day-to-day contexts.

Keywords. Agrosilvopastoral systems, tropics, ruminant production and nutrition

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